What is Claimed:

1. A phased array antenna comprising:

a plurality of radiating elements arranged as orthogonal pairs in a herringbone pattern, and

each radiating element includes multiple microstrips disposed conformally on a planar substrate.

2. The antenna of claim 1 wherein

each radiating element includes a dipole formed as a pair of dipole microstrips extending from a pair of launch points.

3. The antenna of claim 2 wherein

each dipole microstrip of the pair of dipole microstrips extends between one launch point of the pair of launch points and a top loading microstrip, and

the top loading microstrip provides a capacitive load to the dipole.

4. The antenna of claim 3 wherein

the top loading microstrip extends between parallel microstrips for providing an additional capacitive load to the dipole, and

the pair of dipole microstrips are oriented substantially parallel and sandwiched between the parallel microstrips.

5. The antenna of claim 1 wherein

each of the radiating elements is oriented approximately 45 degrees relative to an array scan axis.

6. The antenna of claim 1 wherein

the multiple microstrips are disposed approximately one-quarter wavelength above a ground plane.

7. The antenna of claim 1 wherein

the planar substrate is mounted on a composite substrate having a permittivity and permeability matched at a mid-band frequency of operation to achieve an impedance of approximately 377 ohms.

8. The antenna of claim 7 wherein

the composite substrate is approximately 1/16 of a wavelength in thickness.

9. The antenna of claim 7 wherein

the composite substrate is formed from a compound having electrical and magnetic properties.

10. The antenna of claim 7 wherein

the composite substrate includes an effective dielectric constant of approximately 10.

11. The antenna of claim 7 wherein

the composite substrate is mounted on a dielectric substrate having a dielectric constant value of approximately 98.

12. The antenna of claim 11 wherein

the dielectric substrate is approximately 3/16 of a wavelength in thickness.

13. The antenna of claim 11 wherein

both the dielectric substrate and the composite substrate have an approximate thickness of 1/4 of a wavelength and yield an approximate thickness reduction ratio of 6.6 to 1.

14. The antenna of claim 1 wherein

the multiple microstrips are formed by etching the planar substrate.

15. The antenna of claim 1 wherein

the multiple microstrips are formed by depositing metallic strips on the planar substrate.

16. The antenna of claim 1 wherein

the multiple microstrips are arranged to form a current sheet for an aperture of the phased array antenna.

17. The antenna of claim 1 wherein the radiating elements are arranged to provide mutual coupling to each other to extend operation at a low end of the frequency band.

18. The antenna of claim 1 wherein

each radiating element is excited by a balanced transmission line.

19. The antenna of claim 1 wherein

each radiating element is connected to a transmit/receive network for varying the amplitude and phase of a transmitted signal.

20. The antenna of claim 19 wherein

the transmit/receive network includes a receiver for determining direction and phase of a received signal, and

a processor for controlling the amplitude and phase of the transmitted signal based on the direction and phase of the received signal.

21. An antenna system comprising:

a phased array formed of a plurality of radiating elements arranged in a herringbone pattern, wherein the radiating elements are formed of multiple microstrips disposed conformally on a planar substrate, and

a transmit/receive network connected to the radiating elements for varying the amplitude and phase of a transmitted signal.

22. The antenna system of claim 21 wherein

the transmit/receive network includes a receiver for determining direction and phase of a received signal, and

a processor for controlling the amplitude and phase of the transmitted signal based on the direction and phase of the received signal.

23. The antenna system of claim 21 wherein

the transmit/receive network includes an array of modular transmitters for exciting a corresponding array of the radiating elements.

24. A method of making a phased array antenna comprising the steps of:

(a) conformally forming multiple microstrips on a planar substrate,

(b) arranging the multiple microstrips in a herringbone pattern, and

(c) placing the multiple microstrips of the planar substrate approximately one quarter of a wavelength above a ground plane.

25. The method of claim 24 including the step of:

placing a composite substrate and a dielectric substrate between the planar substrate and the ground plane,

wherein the composite substrate has an effective dielectric constant of approximately 10 and the dielectric substrate has an effective dielectric constant of approximately 98.

26. The method of claim 25 wherein

the composite substrate is made approximately 1/16 of a wavelength in thickness, and

the dielectric substrate is made approximately 3/16 of a wavelength in thickness.